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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,715	10/17/2003	Mei Chen	100205025-1	4628

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FORT COLLINS, CO 80527-2400

EXAMINER

DALEY, CLIFTON G

ART UNIT	PAPER NUMBER
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2609

MAIL DATE	DELIVERY MODE
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06/07/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/687,715

Applicant(s)

CHEN, MEI

Examiner

Clifton G. Daley

Art Unit

2609

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) ✓
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 10/17/2003 ✓
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because; reference character "10" has been used to designate both Object and Object Displacement, reference character "12" has been used to designate both Automobile and Search Region Generator, reference character "16" has been used to designate both Target Image and Validity Measurer, reference character "18" has been used to designate both Pixel Array Blocks and Validity Comparator. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to because reference characters 10 and 18 are used in association with an inverted comma. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures

Art Unit: 2609

appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claim 17 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The elements of the claimed invention are recited in means plus function language, thus invoking the rebuttable presumption that §112, 6th paragraph has been invoked. However the means disclosed in the specification and drawings contain no structural elements.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 17 is rejected as failing to define the invention in the manner required by 35 U.S.C. 112, second paragraph. The elements of the claimed apparatus are recited in means plus function language, thus invoking the rebuttable presumption that §112, 6th paragraph has been invoked. However the means disclosed in the specification and drawings contain no structural elements. Claim 17 therefore lacks the essential elements to make it an apparatus as recited in the preamble.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 5, 6, 8, 9, 13, 14 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Minami et al. (hereinafter "Minami"; US 6380986).

Regarding claim 1, Minami discloses a method for estimating the displacement of at least one object with respect to a first image and a second image, wherein the object is fixed within each of the first image and the second image, the method comprising: generating a plurality of search regions within said second image based on a plurality of

Art Unit: 2609

search parameters (column 3, lines 17-44); determining an object displacement estimate for each of the search regions (column 1, lines 57-67 and column 2, lines 1-5); measuring the validity of each of the plurality of estimated object displacements (column 3, lines 36-41, i.e. minimum computed value of the sum of the absolute values of differences as disclosed in column 1, lines 66-67 and column 2 lines 1-5 for each search region); comparing the validity measurements to determine the best object displacement estimate (Fig. 16, Sum of Absolute Values of Differences/ Minimum Value Detection Device 21); wherein the best object displacement estimate corresponds to the displacement of the object.

Regarding claim 2, Minami discloses a method as defined in claim 1 wherein the search parameters are selected from the group that consists of search region dimensions (column 2, lines 5-14), motion model trajectory (column 3, lines 52-63), search range and step size (column 6, lines 18-23).

Regarding claim 3, Minami discloses a method as defined in claim 2 wherein generating a plurality of search regions comprises: selecting a range of displacement of the object (column 7, lines 32-38, i.e. reference vector); selecting step size for traversing the range within the second image (column 5, lines 32-34 and column 6, lines 21-23); and determining a plurality of search regions within the second image based upon step size and selected range of displacement (column 3, lines 17-21 and 52-59).

Art Unit: 2609

Regarding claim 5, Minami discloses a method as defined in claim 1 wherein the search regions are related to one another (Fig. 9, i.e. regions are overlapping).

Regarding claim 6, Minami discloses a method as defined in claim 5 wherein the search regions are related to one another by a preselected motion model (Fig. 6, S32 and S34).

Regarding claim 8, Minami discloses a method as defined in claim 1 wherein adjacent search regions include overlapping areas (column 13, lines 57-59).

Regarding claim 9, Minami discloses a method as defined in claim 1 wherein determining an object displacement estimate further comprises performing a multiresolution analysis (column 2, lines 42-47).

Regarding claims 13 and 17, since method, system and apparatus are analogous, the system of claim 13 and apparatus of claim 17 are anticipated by Minami as discussed in the method of claim 1 above.

Regarding claim 14, Minami discloses a system as defined in claim 13 wherein: the search parameters include search range and step size (column 6, lines 18-23); and the search region generator is arranged to determine the plurality of search regions within the second image based upon the step size and the selected range of displacement (column 3, lines 17-21 and 52-59).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2609

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami as applied to claim 2 above, and further in view of Sim (US 6912296).

Regarding claim 4, Minami teaches a method as defined in claim 2 above.

Minami does not teach further including: comparing each of said measurements of validity to a cutoff value; selecting at least one new search parameter in the event that none of the measurements of validity exceeds the cutoff value; determining apparent displacement in accordance with the at least one new parameter.

However, Sim teaches comparing each of said measurements of validity to a cutoff value (Fig. 1, Operation 106, i.e. validity measure is Mean Absolute Difference (MAD) and cutoff value is MAD of center point); selecting at least one new search parameter in the event that none of the measurements of validity exceeds the cutoff value (Fig. 1, Operation 108); determining apparent displacement in accordance with the at least one new parameter (Fig. 1A, Operations 110 and 112).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have modified Minami's method with Sim's teaching above. The motivation to combine being that Sim's modification reduces the computational complexity of estimating motion (page 6, ¶0072).

Regarding claim 7, Minami teaches a method as defined in claim 2 above.

Minami does not teach relating the number of search regions to step size. Sim teaches

Art Unit: 2609

the use of a different number of search regions for different step sizes (Fig. 3, i.e. 4 regions for a step size of 4 and 8 regions for a step size of 1).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have modified Minami's method with Sim's teaching above. The motivation to combine being that changing the number of regions based on step size reduces the computational complexity of estimating motion (page 6, ¶0072)

11. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami as applied to claim 13 above, and further in view of Sim (US 6912296).

Regarding claim 15, Minami does not disclose the validity comparator arranged to compare each of the validity measurements to a predetermined cutoff value.

However, Sim teaches comparing each of said measurements of validity to a predetermined cutoff value (Fig. 1A, Operation 106, i.e. validity measure is Mean Absolute Difference (MAD) and cutoff value is MAD of center point).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have modified Minami's system with Sim's teaching above. The motivation to combine being that Sim's modification reduces the computational complexity of estimating motion (page 6, ¶0072).

Regarding claim 16, Minami as modified by Sim discloses a system as defined in claim 15 above. Sim further teaches the validity comparator arranged to determine the best validity measurement that exceeds the predetermined cutoff value (Fig. 1A, Operations 108, 110 and 112).

Art Unit: 2609

12. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Minami as applied to claim 1 above, and further in view of Hanna et al. (hereinafter "Hanna"; US Patent Application 2001/0019621).

Minami does not teach the determination of object displacement estimate further comprising an optical flow analysis.

However, Hanna teaches an object displacement estimate comprising an optical flow analysis (page 5, ¶52 lines 10-13).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have modified Minami's method with Hanna's teaching above. The motivation to combine being that Hanna's modification serves as a predictor of depth in the first and second images (page 5, ¶52 lines 12-15).

13. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami as applied to claim 1 above.

Regarding claim 11, Minami does not teach measuring validity comprising performing an image reconstruction and correlation analysis.

However, image reconstruction and correlation analysis were well known in the art at the time of the invention.

Therefore it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have measured validity by image reconstruction and correlation analysis.

Art Unit: 2609

Regarding claim 12, Minami does not teach measuring validity by performing a residual error analysis.

However, performing a residual error analysis was well known in the art at the time of the invention.

Therefore it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have measured validity by performing a residual error analysis.

Conclusion

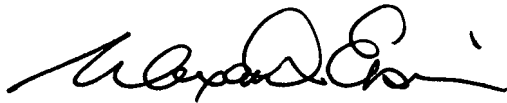
14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kumaki et al., (US 6968011) discloses multiple search regions related to step size. Kametani, (US 6380987) discloses multiple search regions with range changes. Hirabayashi et al., (US 5436674) discloses multiple search stages performed in sequence.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Clifton G. Daley whose telephone number is 571-270-3144. The examiner can normally be reached on Monday - Friday 7:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on 571-272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2609

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read 'Alexander Eisen', with a stylized flourish at the end.

Alexander Eisen
SPE
Art Unit 2609

CGD
6/4/2007